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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,591	03/10/2004	Toshimitsu Hirai	9319S-000727	4716
27572 7590 12/15/2008 HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303				
EXAMINER				
LIN, JAMES				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/797,591

Applicant(s)

HIRAI ET AL.

Examiner

Jimmy Lin

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4-8, 10, 14, 17 and 19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1, 4-8, 10, 14, 17 and 19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

Detailed Action

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/30/2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4-6, 8, 10, 14, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (U.S. Patent No. 6,501,663) in view of Akahira et al. (U.S. Patent No. 6,145,981).

Pan teaches a pattern forming method by arranging droplets of a liquid material. The method comprises a first step of forming a film pattern 153 on the substrate using the droplets, a second step of forming film pattern 155, and a third step of forming film pattern 157 (col. 10, lines 15-20; Fig. 15). The droplets are deposited using an ink jet system (abstract).

Pan does not explicitly teach forming a central part of the film pattern 155 first, then forming film pattern 153 and film pattern 157 around film pattern 155. However, one of ordinary skill in the art would have recognized that any order of forming the film patterns would have achieved similar results and would have performed the arrangement of the film patterns in any order with predictable results. The selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See, for instance, *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946). Therefore, it would have been obvious to

one of ordinary skill in the art at the time of invention to have formed the film pattern 155 of Pan first, as opposed to forming film pattern 153 first, with a reasonable expectation of success.

Pan does not teach that film pattern 155 is formed by depositing a plurality of first droplets spaced apart from each other on the substrate and depositing second droplets in spaces between the first droplets. However, Akahira teaches that it was well known in the art of ink jet printing to have formed a film pattern by depositing a plurality of first droplets spaced apart from each other and depositing second droplets in spaces between the first droplets (Fig. 16B). Because Akahira teaches that such methods were operable in the ink jet art, it would have been obvious to one of ordinary skill in the art at the time of invention to have ink jet printed first and second droplets in the claimed manner in the method of forming film pattern 155 of Pan with a reasonable expectation of success.

Pan does not explicitly teach forming third and fourth droplets for film pattern 153, and fifth and sixth droplets for film pattern 157. However, such modifications would have been obvious over Akahira for substantially the same reasons as discussed in the paragraph immediately above

Claim 2: Pan teaches that the droplets are arranged on the substrate so that the droplets overlap with at least a part of the central part to form the sides (Fig. 15).

Claim 4: Pan teaches that the droplets are set at different positions. Thus, different arrangement conditions must have been required in order to eject the droplet at different positions.

Claim 5: Pan and Akahira do not explicitly teach that the arrangement intervals of the droplets on the substrate in the first, second, and third steps are set to different values. However, one of ordinary skill in the art would have recognized that the arrangement intervals can be set to any values such that the droplets at least overlap the adjacent droplets and such that film patterns 153, 155, and 157 overlap with their respective adjacent film patterns. One of ordinary skill in the art would have used any arrangement intervals that satisfy such requirements with a reasonable expectation of success and with predictable results. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have set the arrangement intervals of the droplets of Pan at any value within the scope of forming a conductive interconnect of Pan,

including having the arrangement intervals of the first, second, and third steps having different values, with a reasonable expectation of success.

Claim 6: Pan does not explicitly teach that the volumes of the droplets in the first, second, and third steps are set to different values. However, one of ordinary skill in the art would have recognized that the volumes of the droplets can be set to any value such that the volume is sufficient for the droplets to at least overlap the adjacent droplets and for the film patterns 153, 155, and 157 to overlap with their respective adjacent film patterns. One of ordinary skill in the art would have used any volume of droplets that satisfy such requirements with a reasonable expectation of success and with predictable results. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have set the volumes of the droplets of Pan at any value within the scope of forming a conductive interconnect of Pan, including having the volumes of the droplets in the first, second, and third steps set to different values, with a reasonable expectation of success.

Claim 8: Pan teaches that the droplets are electrically conductive in order to form an interconnect (col. 10, lines 15-20; Fig. 15).

Claim 10: Pan teaches that the film patterns form a wiring pattern (col. 10, lines 15-20; Fig. 15).

Claim 14: The droplets 1 of Akahira are interpreted to be the claimed first droplets, and droplets 2 and droplets 3 are interpreted to be the claimed second droplets.

Claims 17,19: Pan and Akahira do not explicitly teach 1) that the third droplets partially overlap the first droplets and the fourth droplets partially overlap the second droplets or 2) that the fifth droplets partially overlap the first droplets and the sixth droplets partially overlap the second droplets. Pan only teaches that the droplets from film pattern 155 overlap with the droplets from both film pattern 153 and film pattern 157 (Fig. 15). However, the logical step of forming the first through sixth droplets would have been forming the first, third, and fifth droplets at the same respective locations of the film patterns and second, fourth, and sixth droplets at the same respective locations of the film patterns. For example, the film formations of Akahira all start with droplets 1 at the effective pixel portions, such that droplets 1, 2, and 3 are formed in the same respective locations for the different film patterns (Fig. 16B). Therefore,

it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the droplet patterns as claimed in the method of Pan and Akahira with a reasonable expectation of success because the logical method of forming the droplets would have formed such patterns.

4. Claims 1, 2, 4-6, 8, 10, 14, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan '663 in view of Mishima et al. (JP 10-312743).

Pan is discussed above. Pan does not teach that film pattern 155 is formed by depositing a plurality of first droplets spaced apart from each other on the substrate and depositing second droplets in spaces between the first droplets. However, Mishima teaches that it was well known in the art of ink jet printing to have formed a film pattern by depositing a plurality of first droplets spaced apart from each other and depositing second droplets in spaces between the first droplets (Figs. 4(a)-4(b)). Because Mishima teaches that such methods were operable in the ink jet art, it would have been obvious to one of ordinary skill in the art at the time of invention to have ink jet printed a first and second droplets as claimed in the method of forming film pattern 155 of Pan with a reasonable expectation of success.

Claims 2, 4-6, 8, 10, 14, 17, and 19 are rejected for substantially the same reasons as discussed immediately above.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan '663 in view of Akahira '981, and further in view of Kiguchi et al. (U.S. Publication No. 2003/0003231).

Pan does not explicitly teach a surface treatment step of adjusting a lyophobic property of the surface of the substrate before arranging the droplets on the substrate. However, Kiguchi teaches that it was well known in the art of forming a conductive film by ink jet printing [0065] to have performed a surface treatment step of adjusting an affinity (i.e., a lyophobic property) of the surface of the substrate before arranging the droplets on the substrate [0097]-[0098]. Because Kiguchi teaches that such methods were operable in the art, it would have been obvious to one of ordinary skill in the art at the time of invention to have adjusted the affinity of the

surface of the substrate of Pan prior to arranging the droplets on the substrate with a reasonable expectation of success.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan '663 in view of Mishima '743, and further in view of Kiguchi '231 for substantially the same reasons as discussed immediately above.

Response to Arguments

7. Applicant's arguments filed 9/30/2008 have been fully considered but they are not persuasive.

Applicants argue on pg. 9 that Akahira fails to anticipate or render obvious claims 1 and 14 and those claims dependent therefrom. Applicants additionally argue that Pan fails to anticipate or render obvious claims 1 and 10 and those claims dependent therefrom. However, the claims are obvious over Pan in view of Akahira. The claims are also obvious over Pan in view of Mishima. See above rejections for details.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is (571)272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jimmy Lin/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit
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